



Satellite Internet Review

January 30, 2012

Purpose of Review:

To determine if there were any satellite providers that can supply 1 Mbps download and 256 Kbps upload sustained data rates to each data subscriber in the Mukluk and Interior exchanges where Satellite is the only method of access.

Mukluk and Interior locations considered in this review:

The locations with satellite services include: Cold Bay, Glena, Fort Yukon, Nome, Brevig, Teller, Shishmaref, St. Michael, Stebbins, Shaktoolik, white Mt, Little Diomed, Wales, Golovin, Elim, Unalakaska and Koyuk. *(See Exhibit A for the amount of data customers in each community).*

Satellite Spectrum Analysis:

There are 1552 Internet subscribers in the Mukluk and Interior exchange locations served by satellite. To determine how much spectrum is needed we used the following calculations:

- 1552 users at 1 Mb/s down at 36MHz/ per transponder Telalaska will require 17 transponders to serve this portion of the bandwidth requirement
- 1552 times 256 kb/s at 36 MHz per transponder, the required return transponder space is estimated to be 10 transponders
- To serve the 1552 customers will require 27 transponders
- This traffic will be terminated at the Teleporter location

Rough order of cost for 27 transponders on a C-band and/or KU Band satellite is estimated to be 30 Million per year or \$4000 per user per month.

Satellites Available to serve Mukluk and Interior Communities:

There are only a couple of satellites serving the majority of the northern Telalaska communities.

The first satellite system to be considered is the Telesat Satellite systems which operate three satellites, the Anik F1R, Anik F2 and Anik F3, which serves northern Canada and Alaska on the fixed-service satellite band.

Only Anik F2 and Anik F3 provide broadband Internet service. The F2 satellite, serves Canada's northern territories through providers like SSI Micro and Northwestel. The Anik F3 satellite supplies broadband Internet to providers in northern Ontario, Quebec and Alaska.



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The Telsat organization has indicated if F2 falls out of the sky, every community in northern Canada would go dark. They have reserved bandwidth on Anik F3 in case of an F2 failure and would point all those F2 customers to Anik F3.¹

The Anik F3 satellite is the primary satellite serving Telalaska needs today. It is presently 80% utilized today²

Another satellite system to consider is the Galaxy 18 satellite which can serve the Mukluk and Interior communities. Galaxy 18 is a Space Systems/Loral (SS/L) 1300-series hybrid communications satellite owned by Intelsat and located in geosynchronous orbit at 123° W longitude, serving the continental United States, Alaska, Hawaii, Mexico, and Canada with 24 C-band, and 24 K_u band transponders.³

Galaxy 18 is the home of many free-to-air television channels used by several national TV stations. This satellite is also used by other wireless carriers such as Clear Channel and GCI in Alaska.

Intelsat's quarterly report completed in 2011 indicated that the private broadband networks for global organizations continue to see increased demand for their capacity. In the second quarter of 2011, Bell Canada, Canada's largest communications company, renewed and expanded an agreement with Intelsat to provide a global IntelsatONE network broadband solution for a widely-dispersed civilian government network.⁴ This means transponder space is in high demand in Canada and other northern markets. This increased demand will make it difficult for one carrier to obtain a large portion of transponder space.

We also discover these satellites have limited transponder capacity and there is no near term plan to upgrade bandwidth on Anik F3 and Galaxy 18 in the near future.⁵ This means there is a finite amount of transponder space.

The newest satellite launched to meet the growing data demands was the Viasat 1. The ViaSat-led project was developed by Loral to propel a series of satellites into space which was meant to enter the mainstream of broadband access choices alongside DSL and cable. This satellite was put into space on October 19th 2011.

Because Viasat-1 satellite was just launched late last year, there are limited coverage maps on this satellite. The only one we could find was on Satbeams.com. It indicates the satellite should be able to serve most of Alaska:

¹ Excerpts from a 2010 report <http://www.fridgefta.info/forums/printthread.php?tid=14640>

² This was indicated by Suzanne Palmmini of X2Nsat in January 2012

³ http://en.wikipedia.org/wiki/Galaxy_18

⁴ http://www.intelsat.com/_files/investors/financial/2011/2011-2Qer.pdf

⁵ Anik F3 has 24 transponders in the C band and 32 transponders in the KU band. Galaxy 18 has 24 transponders in C band and 24 transponders in Ku band.

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Here is a map of the expected coverage of Viasat-1⁶

The concern should be not whether the satellite can provide service to the communities but if the companies supplying the signal can support the local residence and businesses in those areas. This support doesn't just stop with the just providing a signal to the residence and businesses in the communities but should be able to meet the local service and support needs to the residence, businesses, schools, libraries and the community.

When we tried to contact a Wild Blue representative the website identify a local reseller out of Anchorage. We contacted that person. He did not indicate he represented Wild Blue directly but indicated he worked with several satellite carriers and indicated he could provide service to the above mention location. He also indicated they would install the system but service would come out of the lower 48. They indicated an engineer would contact me to discuss installation options. As of this writing, I have not had another follow-up call.

Again wanting to understand what Wild blue plans to offer, I looked further on their web site to see if I could get a more definitive answer. I found this FAQ page:

Will Wild Blue be available in Alaska, Hawaii or Puerto Rico?

Answer: Wild Blue is planning to start offering high-speed Internet services in Hawaii and southern Alaska (Anchorage and most of the Kenai peninsula) in early 2012.⁷

⁶ <http://www.satbeams.com/footprints?beam=6554>

⁷ http://www.wildblue.com/overview/faqs#3_3



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I also tried to find a support person from Hughes. I did find installation crews in Fairbanks and a new company just getting started in Anchorage to serve the Kenai and southern areas of the state. I called and they both indicated they only did installation work. Service would come from the Hughes service line in the lower 48. They would only respond to a problem if dispatched by Hughes.

Satellite Teleport Resource Considered in this Analysis:

We solicited three Satellite providers to find out if they could serve the communities outlined above.

- | | |
|---|--|
| 1. Globecom Systems
45 Oser Avenue
Hauppauge, NY 11788
Tel: (631) 231-9800 | Contact: Steve Spreizer (VP - Network Eng.)
Phone: (631)457-1127
Email: sspreizer@globecommsystems.com |
| 2. X2nSat
1333 N. McDowell Blvd. Suite A
Petaluma, CA. 94954
Tel: (707) 283-8000 | Contact: Suzanne Palmini (Sales Executive)
Phone: (707) 283-8012
Email: suzanne@x2nsat.com |
| 3. Satcom resources
PO Box 1639
101 Eagle Rd., Building 7
Avon, CO 81620-1639 | Contact: Chris Weathers
Phone: (970) 748-4255
Email: chris.weathers@satcomresources.com |
| 4. SATELLITE ALASKA | Contact: John MacPherson (only contact in Alaska for Wild Blue)
Phone: 907 243-7475 |

We asked each Satellite company:

1. If they could provide 1Mbps/256KBPS guaranteed sustained throughput from each data consumer in each community and terminate all users to a data access peering point in Anchorage Alaska?
2. If they could provide the service, what would it cost?

Satellites Providers Responses

Globecom Response



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Spreizer, Steve sspreizer@globecom.com

Hi,

Thanks for sending me the information. Unfortunately we are not in a good position to address it. As I mentioned on the phone we do not have a facility in Anchorage to terminate the traffic. I checked and the only coverage we have for Alaska would actually terminate back here at our NY facility and then it would have to be routed back to Anchorage via terrestrial circuit/public Internet. This would not be a good technical solution or cost effective for you.

I think you also need to revisit your bandwidth calculations. Satellite bw is very expensive. 137 Mbps of dedicated capacity will easily cost >\$1M per year.

Best regards,
Steve Spreizer
Vice President - Network Engineering
Phone: [631-457-1127](tel:631-457-1127)
Fax: [631-231-1557](tel:631-231-1557)
Email: sspreizer@globecommsystems.com

On January 30

We pressed Steve to tell us if there was transponder space today to serve TelAlaska needs. This was his final response

"This type of capacity is not readily available today for Alaska. However if someone is really willing to pay this amount of money, a solution can be found."

X2nSat Response

Suzanne Palmini suzanne@x2nsat.com



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Terry - Please find, attached, our findings. The conclusion is it is NOT feasible to dedicate 1M x 512 per subscriber. But, it is doable if you oversubscribe the network and gamble not everyone is "always on" thus freeing up bandwidth. Feel free to correspond directly with Phil should you have any questions. Thank you.

Suzanne Palmmini
Sales Executive
X2nSat, Inc.

X2nSat - The global leader in VSat Networks This e-mail and its contents are covered by any Non-Disclosure Agreements that may exist between our two companies.

This was the suggested design with Overbooking from X2nSat (Still Costly)

10:1 Overbooking scheme for 607 Users with 5 Mb/s max Down & 1 Mb/s max Up
25 Gbyte/month Down max & 5 Gbyte/month Up, then charge extra
Need one 36 MHz transponder for our DVB-S2 at 90 MB/s and 12 MHz for the Upload Returns
Each Remote sites combines the Upload of it's users into a constant carrier back to hub
example 50 users x 30 kb/s avg = 1.5 Mb/s return carrier shared, minimum would have to be 1 Mb/s to meet spec if BW is \$150,000/month over 600 = \$250/month per user, if too much go 20:1 overbook for \$125/month/user

Satcom Response

Chris Weathers chris.weathers@satcomresources.com

Hi,

The most spectral efficient satellite link we've seen runs about 6 Mbits/ MHz. So for 137Mbps, that would require over 23 MHz of space segment just for the downstream bandwidth. Satellite Space Segment is selling for \$4,500 to \$5,000 per MHz, that's a monthly bill of over \$103,000. This is the best case scenario. Of course, there are startup fees and Teleport fees and backbone termination feeds on top of the monthly cost but I wanted to hear if this is worth looking into further or not.

Chris Weathers
Satcom Resources
[970-748-3094](tel:970-748-3094) (Office)
[970-748-4255](tel:970-748-4255) (Direct)
[970-748-3096](tel:970-748-3096) (Fax)



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chris.weathers@satcomresources.com

<http://www.satcomresources.com>

Wild blue contact:

Terry:

Thanks for your time today, expect a call from the HUB, the gentleman is Mr. Keith Lewis, if you do not hear from him in the next couple of days let me know.

SATELLITE ALASKA

John Macpherson

o907 243-7475

c907 227-7844

f907 248-2999



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Conclusion of the Discovery:

The three main hub providers, after reviewing their established resources, came to the same conclusion. Today none could guarantee they could provide the transponder spectrum required to serve Mukluk and Interior data users based on the sustain rates required by their interpretation of the new FCC ruling.

The three main hub providers also indicated the costs for the service would be extremely expensive. The cost per subscriber would be upward of \$4000 per sub per month-- just for the cost of the service. This doesn't include the costs of over head support and management, as well as ongoing customer care, billing and Internet access. These additional costs would increase the month rate by at least \$500 per month per subscriber

The hub respondents indicated an overbook ratio as an alternative. They indicated this could be designed to give the end user the perception that they will have the full bandwidth available to them on a *demand* basis because it is assumed all users will not consume all of their bandwidth at the same time.

The primary advantage of overbooking is to lower transport service cost. It is estimated overbooking will lower the cost of the service by as much as 50%. Studies on internet access using overbooking can yield a 300–500% improvement in costs of access, while still providing useful resource guarantees to applications⁸. Another study completed by Rutgers University in 1999 focused on how the airline industry uses overbooking strategies to manage seat occupancy control while improving revenue streams.⁹

⁸ <http://people.inf.ethz.ch/troscoe/pubs/TOITS09.pdf>; another is on revenue management: http://en.wikipedia.org/wiki/Revenue_management; another report presented to Globecom in 1998: www.cs.ucla.edu/~nrl/hpi/papers/1998-globecom-2.ps

⁹ <http://ben-israel.rutgers.edu/711/McGill-VanRyzin.pdf>



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Exhibit A

Alaska Locations served by Satellite and the Number of DSL Customers Per Location

Cold Bay	47
Galena	142
Fort Yukon	83
Nome	137
Brvig/Teller	47
Shishmaref	34
St. Michael	19
Stebbins	29
Shaktoolik	22
Koyuk	23
Unalaska	695
King Cove	180
Wales	12
Little Diomed	8
Golovin	20
Port Lions	34
White Mt	20
Elim	20
Total number for users	1552



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A General Map Layout of all Mukluk and Interior Locations

